XXVII. *On some new forms of* Entozoa. *By* T. Spencer Cobbold, *Esq., M.D., F.L.S.*

Read January 20th, 1859.

By permission of the authorities of the Zoological Society, I have enjoyed the opportunity of examining a large proportion of such animals as have died at the Society's Gardens, Regent's Park, during the spring and winter months of last season.

The materials thus afforded for a search after *Entozoa* consisted of six species of Reptiles, thirty-one of Birds, and the same number of Mammals. With three duplicate exceptions in the case of birds, and one in mammals, only a single example of each species came under notice, thus giving a total of seventy-two animals subjected to dissection. Of these, but three reptiles, nine birds, and ten mammals were found infested,—a result of considerable interest to the Zoological Society, as it proves these animals to enjoy greater freedom from internal parasites in their condition of domesticity than in the wild state. This indeed is precisely what we should expect, as it is well known that the larvæ of *Entozoa* occur only in a limited number of *hosts*; and it is equally evident, in the case of *Trematoda* for example, that the uninfested foreign animals can have had no opportunity of devouring the various forms of molluscan hosts which under ordinary circumstances supply the *cercariæ* destined to become adult flukes in their viscera.

1. Distoma compactum (mihi). Body smooth, ovate, oblong, not compressed; oral sucker terminal, orbicular; ventral sucker subcentral, aperture triangular; reproductive pore immediately below, a little to the left. Length $\frac{1}{6}$—$\frac{1}{3}$ in.; breadth $\frac{1}{8}$—$\frac{1}{5}$ in. (Pl. LXIII. figs. 1, 2, 3.)

Remarks.—On the 19th of February I removed five specimens of this trematode from pustular cavities in the left lung of an Indian Ichneumon (*Viverra mungos*, L.). All conjecture as to the source of its larvæ must be useless; but the adult form is well marked, and easily recognized by the compact condition and arrangement of the internal organs. It is provided with a short œsophageal bulb, giving off two simple, tortuous and unusually broad digestive canals. The twisting is so marked and regular as to approach the peculiar zigzag condition of *Campula*—a genus which I have recently established (Linn. Trans. vol. xxii. part 3. p. 168). The vitelline cæca almost entirely cover the lateral and dorsal surfaces, and are connected in the middle line by two primary transverse branches; these again unite to form a trunk which opens into the base of the short and folded uterine tube. The testes lie directly below.

The nearest resemblance to this species is a fluke discovered by Natterer at Matogrosso, in cavities of the lungs of the American Otter. Under the title of *Distomum rude*, Diesing has described and figured it in his 'Neunzehn Arten von Trematoden: Wien, 1856.'

2. Distoma minutum (mihi). Body flat, smooth, oblong, narrowed in front; oral sucker oval, subterminal; ventral sucker orbicular, central. Length $\frac{1}{120}$–$\frac{1}{100}$ in.; breadth $\frac{1}{180}$–$\frac{1}{120}$ in. (Figs. 4, 5.)

Remarks.—This exceedingly small trematode was found in great abundance in the duodenum of an Oyster-catcher (*Hæmatopus ostrealegus*, L.), and could scarcely be discerned with the naked eye. Its form is entirely different from *D. brevicolle* described by Creplin as infesting this bird; moreover the latter is a much larger species. The presence of a long uterine canal crowded with ova showed its mature character, while few traces of other organs were to be seen. I did not succeed in detecting with certainty the position of the genital pore, but appearances seemed to indicate its presence directly above and to the right of the ventral sucker.

3. Distoma Bosci (mihi). Body subclavate, covered with minute spines, slightly compressed, thickened below; oral sucker orbicular, subterminal; genital pore above the ventral acetabulum. Length $\frac{1}{4}$–$\frac{1}{2}$ in.; breadth $\frac{1}{12}$–$\frac{1}{10}$ in. (Figs. 6, 7.)

Fasciola colubri, Bosc, Hist. Nat. des Vers, i. p. 271, with figs.

Distoma colubri Americani, Rudolphi, Entoz. Hist. vol. ii. p. 434; and Synops. p. 121; Diesing, Syst. Helminth. vol. i. p. 398.

Remarks.—This species has hitherto been only very briefly noticed, and is placed by Diesing among doubtful and imperfectly-described forms. Like Bosc, I found several specimens in the buccal cavity of an American serpent of the genus *Coluber*, the specific name of which I am unable to give. The worm is provided with a muscular œsophageal bulb, two simple digestive cæca, and largely-developed reproductive organs.

4. Bilharzia magna (mihi). Body smooth, linear, gradually narrowed anteriorly; oral sucker oval, subterminal; ventral acetabulum round, very prominent. Length upwards of 1 in. (Figs. 8, 9.)

Remarks.—Up to the time of Bilharz's discovery of *Distoma hæmatobium*, all the flukes were considered hermaphrodite, and I am not aware that any other species excepting the above has been since found to present a deviation from the general type. Trematodes possessing so marked a structural peculiarity as *D. hæmatobium*, associated as it is with the presence of a gynœcophoric canal in the male, deserve, I think, to be generically separated from *Distomata* properly so called, and I have therefore employed the indefatigable discoverer's name for this purpose. Only a single male example of the species here recorded was observed by me, while engaged in the dissection of a Sooty Monkey (*Cercopithecus fuliginosus*), in some blood which had escaped from the divided portal veins. It is a much larger species than *Bilharzia* (*Distoma*) *hæmatobia*; but its precise length I am unable to record, as a portion of the caudal extremity had been accidentally removed. Unfortunately it was at the time regarded as a common nematode; but had its true nature been earlier detected, a more careful examination of the blood-vessels would probably have brought other individuals to light.

5. Ascaris tribothrioides (mihi). Head truncate, with three sucker-like processes; neck constricted; body uniformly linear; tail conical, with a short blunt extremity. Length about 1 in. (Figs. 10, 11.)

Remarks.—I am not certain that this eccentric-looking nematode should be considered a true *Ascaris*. Two examples only were detected in the small intestine of a Dusky Duck (*Anas obscurus*), and neither of these was sufficiently fresh to exhibit its internal structure to advantage.

6. Cœnurus. From a specimen of the Ring-tailed Lemur of Madagascar (*Lemur maco*), which died at the Zoological Gardens on the 30th December 1857, and which had been in this country only four months, I procured a remarkable series of hydatid-like *cœnuri* (fig. 12). They existed in such abundance in the liver, and on both sides of the thorax, as to become the immediate cause of the animal's death. Those in the chest were connected to the pleura, and occurred in semitransparent pedunculated masses, split up, as it were, into numerous lobules, the entire parts of each separate bunch being connected together and to the surface of the extremely atrophied lungs by short pedicles. Here and there small colonies, consisting of only one or two lobules, were in process of development. Each lobe presented a variable number of small, round, papillary elevations, which in some places assumed a more or less regular linear arrangement. Under a low magnifying power, the surfaces of the imperfectly-formed papillæ exhibited a central oval depression (fig. 13), while each of the more completely developed eminences was found, on dissection, to contain a single well-formed tape-worm head. Enlarged forty diameters, every head displayed four suckers and a short proboscis armed with thirty-two hooks disposed in two rows (figs. 14, 15). No loose *scolices* occupied the interior of the lobules, which were filled, however, with a pale-yellow serous fluid.

Appendix.—Among known forms of *Entozoa*, I may mention the occurrence of *Tænia paradoxa* in the Oyster-catcher (figs. 16–19 inclusive); and in the Dusky Duck (*Anas obscurus*) of numerous partially decomposed *Tæniæ*, referable, I think, to *T. lanceolata* (fig. 20). From the duodenum of a Night Heron (*Ardea nyctocorax*) I obtained ten or twelve examples of *Tænia multiformis* (fig. 23); also three fine specimens of *Eustrongylus papillosus* (fig. 24) from the mouth of a Crane (*Grus antigone*). From the small intestine of an American Barn Owl (*Strix perlata*) were procured nine individuals of *Distoma æquale*, and from a Horned Pheasant several examples of *Tænia infundibuliformis* (fig. 25). The cæca of a Ring-necked Pheasant (*Phasianus torquatus*) were crowded with *Ascaris vesicularis* (fig. 21); and the intestines of a Sandwich Island Goose contained several worms very like *Heterakis dispar* (figs. 26 and 27), besides other nematodes requiring further investigation. The liver of an Axis Deer (*Cervus axis*) contained a few degenerated *Cercariæ*, while a large aborted *Cœnurus* or acephalocyst occupied the left lung of a Goat (*Aries tragelaphus*). Several nematodes (fig. 28) were obtained from the lungs of a Peccary (*Dycoteles torquatus*), while the rectum of a Weasel-headed Armadillo (*Dasypus sexcinctus*) yielded several specimens of *Ascaris retusa* (fig. 22). From the lungs of the Four-horned Antelope (*Antilope quadricornis*) I procured several very large cysts of

Echinococcus veterinorum (*altriciparіens* of Küchenmeister), precisely like those described by Professor Huxley from the Zebra. I also procured some nematodes (figs. 29 and 30) and cestodes (fig. 31) from an Indian Rat Snake (*Coluber Blumenbachii*) measuring six feet long, as well as a single round worm from an Indian Lizard (*Calotes versicolor*), which, together with another large *Ascaris* (figs. 32 and 33) from the intestine of the American Snake formerly alluded to, I have not at present been able to identify.

DESCRIPTION OF THE PLATE.

Tab. LXIII.

Fig. 1. *Distoma compactum.* Enlarged $\frac{1}{3}$th.
Fig. 2. Another example. × 5 diameters.
Fig. 3. Egg of the same. × 360 diameters.
Fig. 4. A few drops of mucus, &c., taken from the duodenum of the Oyster-catcher, and spread on a thin square of glass. It shows several small flukes. Nat. size.
Fig. 5. *Distoma minutum,* from the same. × 180 diameters.
Fig. 6. *Distoma Bosci.* × 8 diameters.
Fig. 7. Egg of the same. × 200 diameters.
Fig. 8. *Bilharzia magna.* Nat. size. Assumed proportion of the lost end of the tail in outline.
Fig. 9. Upper two-thirds of the same. × 10 diameters.
Fig. 10. Head of *Ascaris tribothrioides.* × 160 diameters.
Fig. 11. Tail of the same. × 160 diameters.
Fig. 12. Colony of *Cœnuri* from *Lemur maco.* Nat. size.
Fig. 13. Part of an immature lobule. × 20 diameters.
Fig. 14. Tape-worm head from one of the mature papillæ. × 40 diameters.
Fig. 15. Hooks from the same. × 260 diameters.
Fig. 16. *Tænia paradoxa.* Nat. size.
Fig. 17. Head of the same. × 260 diameters.
Fig. 18. Everted extremity of the rostrum. × 260 diameters.
Fig. 19. Upper joints of the same. × 150 diameters.
Fig. 20. Tape-worm head. *T. lanceolata*? × 250 diameters.
Fig. 21. Tail of *Ascaris vesicularis.* Male. × 30 diameters.
Fig. 22. Tail of *Ascaris retusa.* Male. × 25 diameters.
Fig. 23. Head of *Tænia multiformis.* × 200 diameters.
Fig. 24. Head of *Eustrongylus papillosus.* Enlarged.
Fig. 25. Head of *Tænia infundibulum.* × 80 diameters.
Fig. 26. Tail of *Heterakis dispar*? Male. About 60 diameters.
Fig. 27. Tail of *Heterakis dispar*? Female. About 60 diameters.
Fig. 28. Tail of a female *Ascaris* from the Peccary. × 100 diameters.
Fig. 29. Head of an *Ascaris* from *Coluber Blumenbachii.* × 60 diameters.
Fig. 30. Larval nematode from a cyst in the heart of the same Serpent. × 60 diameters.
Fig. 31. Head of a cestode from the muscles of the same. · Enlarged.
Fig. 32. Head of an *Ascaris* from the intestines of an American Snake.
Fig. 33. Tail of the same. × about 20 diameters.